1				**Background Statistics for Data Sets with Non-Detects**								
2			**User Selected Options**									
3			Date/Time of Computation	7/30/2013 11:22:51 AM								
4			From File	WorkSheet.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	95%								
7			Coverage	95%								
8			rent or Future K Observations	1								
9			mber of Bootstrap Operations	2000								
10												
11	**BEHP**											
12												
13						**General Statistics**							
14					Total Number of Observations	63			Number of Missing Observations	0		
15					Number of Distinct Observations	48						
16					Number of Detects	48			Number of Non-Detects	15		
17					Number of Distinct Detects	41			Number of Distinct Non-Detects	10		
18					Minimum Detect	4.2			Minimum Non-Detect	3.2		
19					Maximum Detect	120			Maximum Non-Detect	31		
20					Variance Detected	876.4			Percent Non-Detects	23.81%		
21					Mean Detected	39.8			SD Detected	29.6		
22					Mean of Detected Logged Data	3.37			SD of Detected Logged Data	0.874		
23												
24					**Critical Values for Background Threshold Values (BTVs)**							
25					Tolerance Factor K (For UTL)	2.007			d2max (for USL)	3.045		
26												
27					**Normal GOF Test on Detects Only**							
28					Shapiro Wilk Test Statistic	0.893			**Shapiro Wilk GOF Test**			
29					5% Shapiro Wilk Critical Value	0.947			Data Not Normal at 5% Significance Level			
30					Lilliefors Test Statistic	0.143			**Lilliefors GOF Test**			
31					5% Lilliefors Critical Value	0.128			Data Not Normal at 5% Significance Level			
32					**Data Not Normal at 5% Significance Level**							
33												
34					**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**							
35					Mean	32.86			SD	28.63		
36					95% UTL95% Coverage	90.3			95% KM UPL (t)	81.04		
37					90% KM Percentile (z)	69.54			95% KM Percentile (z)	79.94		
38					99% KM Percentile (z)	99.45			95% KM USL	120		
39												
40					**DL/2 Substitution Background Statistics Assuming Normal Distribution**							
41					Mean	32.87			SD	28.7		
42					95% UTL95% Coverage	90.46			95% UPL (t)	81.17		
43					90% Percentile (z)	69.65			95% Percentile (z)	80.08		
44					99% Percentile (z)	99.64			95% USL	120.3		
45					**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**							
46												
47					**Gamma GOF Tests on Detected Observations Only**							
48					A-D Test Statistic	0.25			**Anderson-Darling GOF Test**			
49					5% A-D Critical Value	0.765			etected data appear Gamma Distributed at 5% Significance Lev			
50					K-S Test Statistic	0.0618			**Kolmogrov-Smirnoff GOF**			
51					5% K-S Critical Value	0.13			etected data appear Gamma Distributed at 5% Significance Lev			
52					**Detected data appear Gamma Distributed at 5% Significance Level**							
53												
54					**Gamma Statistics on Detected Data Only**							
55					k hat (MLE)	1.743			k star (bias corrected MLE)	1.648		
56					Theta hat (MLE)	22.84			Theta star (bias corrected MLE)	24.16		
57					nu hat (MLE)	167.3			nu star (bias corrected)	158.2		
58					MLE Mean (bias corrected)	39.8						
59					MLE Sd (bias corrected)	31.01			95% Percentile of Chisquare (2k)	8.32		
60												
61					**Gamma ROS Statistics using Imputed Non-Detects**							
62					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							

	A	B	C	D	E	F	G	H	I	J	K	L
63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66					Minimum	0.01				Mean		32.31
67					Maximum	120				Median		23
68					SD	29.23				CV		0.905
69					k hat (MLE)	1.031				k star (bias corrected MLE)		0.992
70					Theta hat (MLE)	31.35				Theta star (bias corrected MLE)		32.56
71					nu hat (MLE)	129.9				nu star (bias corrected)		125
72					MLE Mean (bias corrected)	32.31				MLE Sd (bias corrected)		32.44
73					95% Percentile of Chisquare (2k)	5.962				90% Percentile		74.54
74					95% Percentile	97.06				99% Percentile		149.4
75	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
76	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
77					WH	HW					WH	HW
78				Approx. Gamma UTL with 95% Coverage	117.1	130.2				95% Approx. Gamma UPL	95.31	102.9
79				95% Gamma USL	209.3	255.5						
80												
81	**The following statistics are computed using gamma distribution and KM estimates**											
82	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
83					k hat (KM)	1.317				nu hat (KM)		166
84					WH	HW					WH	HW
85				Approx. Gamma UTL with 95% Coverage	108.8	115.5				95% Approx. Gamma UPL	89.77	93.26
86				95% Gamma USL	187.8	214.1						
87												
88	**Lognormal GOF Test on Detected Observations Only**											
89					Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**					
90					5% Shapiro Wilk Critical Value	0.947	Data Not Lognormal at 5% Significance Level					
91					Lilliefors Test Statistic	0.0991	**Lilliefors GOF Test**					
92					5% Lilliefors Critical Value	0.128	Detected Data appear Lognormal at 5% Significance Level					
93	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
94												
95	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
96					Mean in Original Scale	32.76				Mean in Log Scale		3.1
97					SD in Original Scale	28.79				SD in Log Scale		0.932
98					95% UTL95% Coverage	144				95% BCA UTL95% Coverage		109.2
99					95% Bootstrap (%) UTL95% Coverage	110				95% UPL (t)		106.5
100					90% Percentile (z)	73.27				95% Percentile (z)		102.8
101					99% Percentile (z)	193.9				95% USL		378.9
102												
103	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
104					KM Mean of Logged Data	3.074				95% KM UTL (Lognormal)95% Coverage		156.1
105					KM SD of Logged Data	0.985				95% KM UPL (Lognormal)		113.5
106					95% KM Percentile Lognormal (z)	109.3				95% KM USL (Lognormal)		434.4
107												
108	**Background DL/2 Statistics Assuming Lognormal Distribution**											
109					Mean in Original Scale	32.87				Mean in Log Scale		3.106
110					SD in Original Scale	28.7				SD in Log Scale		0.938
111					95% UTL95% Coverage	146.8				95% UPL (t)		108.3
112					90% Percentile (z)	74.34				95% Percentile (z)		104.5
113					99% Percentile (z)	198.1				95% USL		388.9
114	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
115												
116	**Nonparametric Distribution Free Background Statistics**											
117	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
118												
119	**Nonparametric Uppper Limits for BTVs(no distinction made between detects and nondetects)**											
120					Order of Statistic, r	62				95% UTL with95% Coverage		110
121					Approximate f	1.632				Confidence Coefficient (CC) achieved by UTL		0.83
122					95% UPL	100.4				95% USL		120
123					95% KM Chebyshev UPL	158.6						
124												

	A	B	C	D	E	F	G	H	I	J	K	L
125	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
126	data set free of outliers and consists of observations collected from clean unimpacted locations.											
127	The use of USL tends to provide a balance between false positives and false negatives provided the data											
128	represents a background data set and when many onsite observations need to be compared with the BTV.											
129												